UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/469,317	12/22/1999	HYUN-EUN KIM	P64146US0	4832

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EXAMINER
SOLOMON, GARY L

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2615	

DATE MAILED: 06/16/2004   /0

Please find below and/or attached an Office communication concerning this application or proceeding.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *June 1, 2004*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All   b)☐ Some * c)☐ None of:

        1.☒ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____.

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1.   A request for continued examination under 37 CFR 1.114, including the fee set forth in

37 CFR 1.17(e), was filed in this application after final rejection. Since this application is

eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e)

has been timely paid, the finality of the previous Office action has been withdrawn pursuant to

37 CFR 1.114. Applicant's submission filed on June 1, 2004 has been entered.

Response to Arguments

2.   Applicant's arguments filed June 1, 2004 have been fully considered but they are not

persuasive.

3.   Applicant submits that none of the references discloses or suggests an analog reference

voltage generating means and a selecting means as recited in the amended claim 1. The

examiner respectfully disagrees.

Yiannoulos (US 5,982,318), **not Xiao (US 6,137,432)**, teaches the analog reference

voltage means having first to third reference voltage generators (Column 10, Lines 5-12). There

is one generator for red, one generator for blue, and one generator for green. (Figure 6, Element

120). Yiannoulos further discloses in Column 10, Line 24-25 that there are as many as ramp

generators as colors.

The only differences in the ramp generators are the current source (Column 10, Lines 30-

33). Different values of the current source will change the value of the analog reference voltage

of each of the colors. In Column 9, Lines 20-22, Yinnoulos stated that voltage is a function of

current and resistance and also that resistance is constant. Therefore, changing the current will change the voltage.

In regards to the selecting means, the Xiao (US 6,137,432) reference is used in combination with Yiannoulos (US 5,982,318) and Xie (US 5,874,994).

Placing of the notoriously well-known Bayer filter (Xie; Figure 6; Column 5, Lines 45-47) in combination with the Yiannolous invention would allow for the selection of two of the three-color pixels (Xie; Figure 6). The Bayer array is the same pattern as the applicant presents in his figures. In each column of the Bayer filter, only two color pixels are present: Red and Green or Green and Blue. This would cause for only two of the three-color pixels to be selected.

Since two colors would be sent from the Bayer Filter, the selector of Xiao would select one of the two analog reference voltages respectively corresponding to the two color pixels included in the column pixel array (Xiao; Figure 2, Element 27 and 28; Column 2, Lines 30-41).

The combination of Yiannoulos in view of Xie and Xiao would have been obvious to one of ordinary skill in the art at the time of the invention in order to use the common Bayer filter pattern.

Therefore, it would have also been obvious to one of ordinary skill in the art at the time of the invention to configure the Yiannoulos, Xie, and Xiao teachings in order to thereby significantly reduce power when converting analog pixel data into digital pixel data from an APS Array (Xiao; Column 1, Lines 50-60).

Claim Rejections - 35 USC § 103

4.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

5.   Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yiannoulos

(US 5,982,318) in view of Xie (US 5,874,994) in further view of Xiao (US 6,137,432).

6.   For claim 1, Yinnauolos discloses an apparatus for converting an analog image data into

a digital image data in a CMOS image sensor including a pixel array having M (row lines) X N

(column lines) color pixels (Column 2, Lines 45-48), wherein the color pixels include a first

color for sensing a first color, a second color for sensing a second pixel, and a third color a third

color pixel (Column 9, Line 60 through Column 10, Line 5).

However, Yiannoulos does not teach having two color pixels selected among the first to

third color pixels. Nevertheless, one of ordinary skill in the art would know that the placing of

the notoriously well-known Bayer filter (Xie; Figure 6; Column 5, Lines 45-47) in combination

with the Yiannolous invention would allow for the selection of two of the three-color pixels

(Xie; Figure 6). The Bayer array is the same pattern as the applicant presents in his figures. In

each column of the Bayer filter, only two color pixels are present: Red and Green or Green and

Blue. This would cause for only two of the three-color pixels to be selected.

Yiannoulos also discloses the analog reference generating means for generating first to

third different analog reference voltages according to the first to third color pixels, wherein the

different analog reference voltage has a different value and a different decline rate from the other

analog reference voltages (Column 10, Lines 1-45; Red, Green , and Blue have different values and different decline rates.).

Although, Yiannoulos and Xie teach all the previous limitations, they lack the selecting means, in response to the control signal, for selecting one of the two analog reference voltages, which are inputted based on the two color pixels in the column pixel array, respectively corresponding to one of the two of the 1st to 3rd color pixels included in the column array.

However, the combination of Yiannoulos and Xie would allow for the selecting means of Xiao (Figure 2) to be used. Since two colors would be sent from the Bayer filter, the selector of Xiao would select one of the two analog reference voltages respectively corresponding to one of the two color pixels included in the column pixel array (Xiao; Figure 2, Element 27 and 28; Column 2, Lines 30-41).

Xiao further teaches a comparing means for comparing the selected analog reference voltage and the analog image data to generate the digital image data corresponding to the color pixels (Column 2, Lines 15-41; Figure 4).

The conversion operation of the analog image data into the digital image data is differently carried out according to the different color characteristics as is taught by Yiannoulos in Column 10, Lines 5-35).

The combination of Yiannoulos and Xiao would haven been obvious to one of ordinary skill in the art at the time of the invention in order to use the common Bayer filter pattern. The Bayer pattern is well known and widely used in the art. Therefore it would be obvious to use such a common and well known pattern.

Therefore, it would have also been obvious to one of ordinary skill in the art at the time of the invention to configure the Yiannoulos, Xie, and Xiao teachings in order to thereby significantly reduce power when converting analog pixel data into digital pixel data from an APS Array (Xiao; Column 1, Lines 50-60).

For claim 2, the Yiannoulos, Xie, and Xiao references disclose all the previous limitations and also, wherein the analog reference voltage generating means includes:

a first reference voltage generator for generating a first reference voltage with respect to the first color pixel;

a second reference voltage with respect to the second color pixel; and

a third reference voltage with respect to the third color pixel (Yiannoulos; Column 10, Lines 24-30).

For claim 3, the Yiannoulos, Xie, and Xiao references disclose all the previous limitations. In the Bayer pattern, as is disclosed in the Xie reference,

the first color pixels and the second color pixels repeatedly arranged on odd row lines of the pixel array in this order;

and the second color pixels and the third color pixels repeatedly arranged on even row lines of the pixel array in this order (Xie; Figure 6).

For claim 4, the Yiannoulos, Xie, and Xiao references disclose all the previous limitations.

Xiao also teaches in his apparatus wherein the selecting means selects the appropriate analog reference voltage in accordance with different values of analog reference voltage signals

(Figure 6). Xiao's method of selecting different analog signals can easily be altered by one of

ordinary skill in the art to use different analog reference voltages of color pixels.

It is well known in the art to select first and second analog reference voltages for a given

column of an image array having columns parallel with Analog-Digital Conversion, as disclosed

in Figures 1 and 2 of Xiao.

In Figure 2 of Xiao, it is disclosed that the selecting means on each column line select the

pixel data from each respective column. The columns are either even or odd.

For claim 5, the Yiannoulos, Xie, and Xiao references disclose the first color pixel is a

red color pixel, the second color pixel is a green color pixel, and the third color pixel is a green

color pixel (Yiannoulos; Column 10, Line 4).

For claim 6, the Yiannoulos, Xie, and Xiao references disclose all the previous

limitations and also wherein the selecting means is a multiplexer (Xiao; Figure 2 Element 30;

Column 2, Line 30-33).

Conclusion

7.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Gary L Solomon whose telephone number is (703)-305-4370.

The examiner can normally be reached on Monday - Friday 8:00 AM - 5:00 PM.

8.   If attempts to reach the examiner by telephone are unsuccessful, the examiner's primary,

Ngoc-Yen Vu can be reached on (703)-305-4946. The fax phone number for the organization

where this application or proceeding is assigned is 703-872-9306.

9.   Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

        GLS

NGOC-YEN VU
PRIMARY EXAMINER